

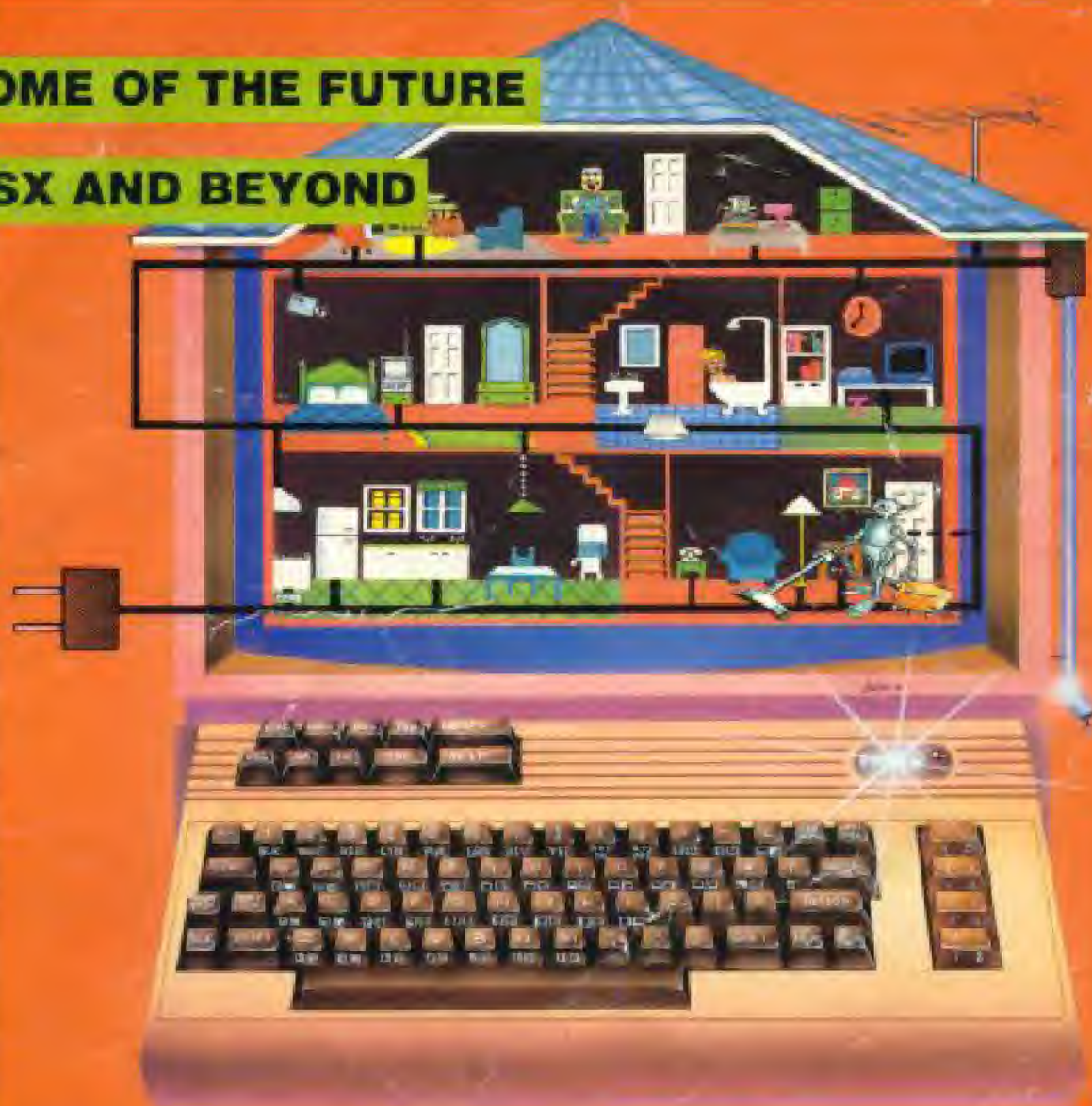
VOLUME 1 • ISSUE 2 • APRIL 1986

HomeBus ^{INFO}

INDEPENDENT MAGAZINE ABOUT RESIDENTIAL CONTROL & MONITORING

HOME OF THE FUTURE

MSX AND BEYOND



• HOME NET • DOBUS • INTELLISYS •
• SMART HOUSE • X-10 • KANSAI •

A WORLDWIDE PUBLICATION
OF SALA
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EDITORIAL

What is Home Bus Info all about?

The art of interconnecting domestic appliances and electronic entertainment equipment is in an infant stage. Little standardization or compatibility has been achieved and even the nomenclature is cumbersome. Some clarification is needed, and Home Bus Info will at least have a go at this enormous task. This special issue will give an overview, a status report, about the Home Bus industry as it is emerging.



HOME BUS:

The Backbone of the home of the future

The field this magazine, and the newsletter with the same name, but a more dedicated and news oriented form will cover encompasses integrated information processing, monitoring and control in the home and its immediate surroundings, including the gateways to media like telephone, TV, cable networks, and other signal carriers. Keywords like Home Bus, Home Electronics System, SAN (Small Area Network), Inhouse Net, Domestic Bus, and Homenet are used to describe such systems. Many combinations of buzz-words like Home, Smart, Intelligent, House, Domestic, Master, Domo, Net, and Systems have been used and will be used to describe or brand-name products for this market. We, as the publishers of this magazine, have no intention of claiming the "HOME BUS" indication as we hope that at least one word will survive the copyright battle to serve as a generic term. By distributing this magazine all over the world, we will at least give the word some protection.

Home Bus or Domestic SAN?

There are many names used for this phenomenon and although we picked Home Bus as our title, other names could become more prevalent. We list some systems and give a schematic overview of some of the systems we have encountered:

Home Bus (Japan and general)
SAN (Small Area Network)
Inhouse network (ICITT)
Home Electronic Bus (IEC/HBA)
Smart House (HBA)
D2B-Domestic Digital Bus (Canelec/Philips)
Home Net (GEC)
DoBUS-Domestic Bus (Philips)
Home Electronic Systems Bus (Japan)

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Applications

At this stage, the number of applications we encounter grows every day. A good networking system for appliances in the home is not something for today, it will be the backbone of the dwellings of future generations. This also implies that the backbone we are now planning and constructing must be strong and well defined, but also open/architected, in short "Future Proof".

Although the list of potential candidates for connection to a home network is nearly endless, our shortlist reads:

- Audio equipment
- CD-ROM readers
- Domestic Appliances
- Electronic Mail terminals
- Ergonomic devices for the handicapped
- Game computers
- Heating/Air conditioning
- Home computers
- Home controller main unit
- Hot water supply
- Facsimile
- Lighting
- Monitoring equipment
- Musical instruments
- Robotics
- Telebanking terminals
- Telephone
- Teletex
- Thermostat
- Security systems
- Sensors for vibrations, temperature, moisture, pressure, and smoke.
- TV-sets
- Remote control of entertainment equipment
- Videotex terminals
- Video cassette recorder
- Video disks
- WORM laser disks



HOME BUS INFO

This magazine is a special issue of the newsletter HOME BUS INFO, mailed to companies in this field and distributed at major trade shows. It serves as an eye-opener to a wider audience about the developments in home control and as a promotion for the Home Bus Info newsletter and Home Bus Report.

This publication is the world's first to cover the emerging field of home interactive and integrated systems; the domestic environmental control arena.



Home Bus, as the generic term for Homecontrol, Home Monitoring, and Home Interconnect applications, is widely accepted as an appropriate description. The days of the homecomputer are ending. The computer industry is at a loss as far as home applications go and needs new stimuli. We think that home bus could be one of them, giving the end-user some feeling of usefulness by using his micro as the master station. However, in the long run, the home bus will have embedded computer systems as controllers and then the home-micro will be just one of the appliances.

HOME-BUS ACTIVITIES and PRODUCTS

Name	Description	Purpose	Country	Organisation/supplier	Medium	Data rate
ISDN S-BUS	Digital Common Carrier PTT		CEPT	ITU	Twisted Pair	2x84kb/s x10kb/s
DOB	Digital Domestic Bus	Standard	Europe	Philips Ceneltec	Balanced Wire Pair/Coax	8kb/s Asynch
HOME ELEC- TRONICS BUS	Home control & monitoring	Standard	USA	EGA	Wire Pair/ Coax	
HTS	Home terminal System		Japan	Sharp		8.6 kb/s
HAN I			Japan	NTT	Twisted Pair/ Coax	10 kb/s
HOME BUS SYSTEM	Multimaster	Standard	Japan	Ministry P&T	Wire Pair/ Coax	8.6 kb/s
MITIHOME BUS	HB MITI		Japan	Ministry Inter. Tr.	Wire pair/Coax	9.6 Kb/s
HALS			Japan	Matsushita		18 kb/s
REC HOME BUS SYSTEM	Kansai Home Bus System	experimental	Japan	REC(Kansai EIDC)	Coax	9600b/s Asynch
JEMA HOME BUS	HB JEMA	development	Japan	Japan Electr. Manf.		
RC5	REMOTE CONTROL IR	audio-video	Netherlands	Philips	Infrared transmission	one way
POWER- HOUSE X-10	Power line superimpose	product	USA	X-10 Corp.	Power Line	
HOME- MINDER/NET	Power line superimpose	product	USA	GEC	Power Line	60 b/s Synchron
SMART HOUSE		project	USA	HBA	Power Line	

The Home Bus systems that are now being studied, or proposed as standards or are in an experimental or even product phase can be divided into a number of categories. There are a number of classifications possible, but we use one that gives the broadest perspective.

The Home Bus Arena



Who is fighting for a share of the pie?

The task of classification, and standardization as the next logical step, rest with a number of trade organizations throughout the world. Not only is the ISO or the IEC involved with its European CEN and CENELEC counterparts, but the ITU is involved with the CCITT and CCIR organizations for the telecommunications part of the home bus. Also the home builders and probably a score of other organizations have an interest in the standardisation of the Home Bus.

Classification

In a number of places around the world the concept of the All-Electronic Home is being studied; experiments are underway, and research projects have been funded. There is even an undercurrent towards a standardized way of interconnecting the various appliances and systems in and around the human habitat.

The idea of building the home of the future became a reality through efforts of private individuals, for instance the Xanadu Elec-

tronic House in Florida, the Intellisys house in Dallas, or of government bodies or companies. The Kansai Electronic Home in Japan is a prime example of a government instigated project which private industry is cooperating in order to gain experience. This is a showcase exhibiting standardization efforts. But in reality little standardization has been achieved with the exception of a de facto X-10 standard for powerline systems in the US and the Philips/Cenelec Digital Domestic Bus (D2B) standard in Europe. Knowledge about the Home Bus is still limited; there is little or no coordination; therefore market forces are and will remain the main influences.

The government can only stimulate like in the case of the Kansai Electronic Home project or in the more recent Eureka Electronic Home project of the EEC in various European countries.

Strategic issue

To describe this field, one has to look into the strategic influences - the parties concerned.

1 Communications based systems.

In these systems the link between the various appliances and controllers is the most important. This bus or tree or star network with various parameters like carrier medium, band width, and control type is used to communicate control signals, sometimes alone and in other cases combined with other signals (telephone/ audio-video) or power.

The main dichotomy and one of the hot discussion points is the inclusion of gateways to the Public Switched Networks. Should the Common Carrier (PTT) be involved or not, should the inhouse-network be totally separate or not?

Typical forms within this category:

- power network superimposed
- telephone line communication
- cable TV superimposed
- separate hard wired
- separate Infra Red links
- separate voice frequency links
- separate radio frequency links

2 Personal computer based systems

In this category the micro serves as the central controller via A/D interfaces or separate control interfaces. Sometimes the micro is the heart of the system; sometimes it acts only as a monitoring device.

3 Dedicated stand alone systems.

There is a limited number of applications with a special controller and a wider range of applications with standard controllers.

Market forces

Integrated home electronics or home control and monitoring, whatever the name of the house of the future is, it is a very promising market. So the hypothetical "average consumer" of the future finds himself beleaguered by at least three competing forces. These are the communications people, the makers of domestic equipment, and the media (software) people.



These three forces might seem united at times, but there is a fundamental dispute among them with legal, practical, and political roots. One of the main issues of the late 80's and early 90's will be which of these forces will establish itself as the dominant architect and standard-setter of the all-electronic home.

Manufacturers

The equipment makers feel they have a natural right to this since they have been supplying the domestic appliances and the recreational equipment in the audio and video field. They are working towards improved user-friendliness and connectability of these sub-systems and have the marketing power to push their solution. Several Japanese companies have a number of study projects under way, either on an individual basis or in cooperative projects, instigated by government bodies.

Telecoms

The communications people's claim to the home bus comes from various angles. The telecoms people consider it an attractive expansion of their territory, but the power companies have something to offer too. Use of the mains cabling to carry extra signalling is the most popular form of home-control in the US, however in Europe it is much harder to acquire approval to superimpose signals on the mains. The PTT's (Common Carriers) are eager to supply more services to the home than just the 4 KHz for the telephone service and its practical maximum of 4800 bits/s of analog datacommunications. Their approved (CCITT/ITU) next step is the digital S-bus with 2x64 Kb/s (56 Kb/s in the US) telephone or data channels plus 16 Kb/s D-channel signals and home-monitoring information. Numerous new services could be accommodated, but there has to be a good legal base. The strategic committees and research labs of the Telecommunications organizations all over the world have seen this opportunity, but play it rather low-key as they do not want to upset the general public and make this a political issue before they are ready with well documented and internationally standardized solutions. In order to arrive at these, they will probably have to revise their S-bus standard as it is inappropriate for inhouse communications with local exchange involvement. Some of the D-channel should be allocated for private use or the whole Bus should be expanded with some more 64 Kb/s channels.

A third communications oriented party is the cable-TV industry. They have to bring a cable to the homes anyway so why not expand a bit further?

The media

The media world (and this includes software of any kind) is not yet very active in the home bus arena, but they will be. It is a matter of band width; will the homebus transmit the high band widths for video-information or not? Can the media, the news-industry, television, movies, publishers pass, when the recreational equipment is all-interconnected, when new entertainment opportunities emerge and threaten the old ones? What if teleshopping, telebanking, teleworking and thus individual tele-advertising, the electronic direct mail alternative, will take away the advertising budgets from the media? Can movie makers forego the interactive possibilities; will TV-stations be able to restrict themselves to offering only 2-D programs with little interaction?

The media are in it for a piece of the action too. Although interactive TV has not met with great success - the Columbus, Ohio QUBE experiment has been discontinued - the media have to reach the people to sell their entertainment and information services either via the coaxial cable of the cable networks, the DBS satellite, the air, or via the expanded telephone communication system.

Mass-media does not care; the service that offers the most profitable link into the home will be favored. New media experiments like the French Minitel, the Hi-Ovis project in Japan and Bigfon in Berlin indicate that the communications and media

people might eventually join forces and push the equipment makers out.

Forerunners of the home bus

There are a number of areas where applications using the home bus technology or its descendants are most likely to emerge. These areas include the medical world, facilities for the handicapped, the car industry, hotels and institutional buildings, and the military. Gadget-hungry people will also form an initial market, both in the computer field and among owners of expensive all-electronic houses.

The alarm and security systems industry has a good entry into the Home Bus business as it already has customers, distribution channels, a number of feasible products, and it works with mass-produced electronic devices.

They are up-to-date regarding issues such as security, reliability, convenience, installability, and tamper-proofing. They also have an inroad into what most likely will be the first target for homebus systems of some complexity - those of the car industry. Car manufacturers would of course like to replace the expensive copper wiring in the car with a single (glass fiber?) system to control lighting, electrical appliances and fixtures, air conditioning, theft-prevention systems, and engine-monitor. The Domestic Bus or SAN technology might overtake the family car before it becomes a part of the household. ■

Telecommunications Gateways

A fundamental problem in home information and home control systems is the fact that the in-house part and the external communication part of such a system are two separate worlds, governed by different authorities and with different suppliers.

This is not so by nature, but because of the legal situation concerning the PTT's/ Common Carriers, especially outside the USA. Their domain ends at the doorstep, and most independent manufacturers intend to keep it that way. The PTT's of course want to extend their control over the communications needs of the customer into the house.

The result is two standardization areas that should be combined or made compatible, but little progress can be detected there. For instance the ITU activities concerning the Integrated Services Digital Network ISDN in its telephone/data only version, the 144 Kb/s standard does not involve any in-house communication independent of the local exchange. They have not (yet) fully taken into account the emerging needs for in-house communications and gateway function between in-house and public switched networks. The PTT (ITU) intention is that the new digital ISDN world will have a so-called S-BUS to the home and in the home (a 144 Kb/s link with 2 B-channels for 64 kb, or 56 kb/s in the US, speech or data plus a D-channel. The D-channel is used for signalling, and some space for additional data communication, home monitoring, telemetry, etc.

video equipment as an extension of infra-red remote control, but its implications are much wider. The increasing number of devices (TV, VLP, VCR, AUDIO, HC, etc.), each with its own sophisticated facilities (viewdata, teletext, stereo TV, etc.), makes integrated controlling inevitable. Philips' main intention therefore was to create a system which allows the user to control all equipment via only one remote controller. The actions of the user and the inherent responses of the system are to be displayed on a TV screen: thus improving the user friendliness through the DDB.

The DDB is a multi-master bus i.e. every device has the capability of taking the initiative to communicate with another device; there is no need for a central controller. Up to 25 units may be attached to the bus with a maximum total length of 50 meters.

There are 3 Modes which differ in speed of transfer only:

- Mode 0 - the microprocessor as a bus controller for low speed data transfers
- Mode 1 - dedicated hardware as bus controller for moderate data transports
- Mode 2 - high speed mode for large data transports.

In order to make a device suitable for attachment to the bus, the unit must have an interface; in this case the DDB controller. The kernel of the controller is a chip, the SAA 1035 which is now being revised.

However a user acceptance system has already been set up in order to acquire feedback information from users.

The DDB concept has received considerable support so far and the GENELEC has already incorporated it as a standard. In fact, the standard Eurobus connector for audio/video equipment already has two pins assigned to the DDB.

Competition

There is a lot of activity in the world in the field of home control systems. Every major electronics or computer company is developing its own home system. Some companies have already tried to establish a standard by pushing their system into the market early. GEC's Homenet (X-10 ba-



sed) and Philips' DDB have been quite successful. Although these systems are not accepted worldwide, they will certainly set a "guideline" for future developments. There is a fundamental difference between Homenet and the DDB. Homenet is a home control system to manage the entire house environment. The interconnection of the devices is made through the power lines and the information transfer is based on a super-imposed signal on that power line; thus every position in the house can be reached. DDB is merely a single-room equipment entertainment cluster system for interconnecting audio and video devices. The connection is made through cable (wire pair). Both systems are suited for control signal transmission only; the capacity of power lines or DDB controller is too small to transfer broad frequency band signals.

At the moment only X-10 compatible products, together with some systems (Cyberlynx, etc.) based on the same principle, are available in the shops in the US, while in Europe there are hardly any home control products available. Obviously in setting a standard (DDB) and exploring the home control area, Philips has taken a lead. Its position as a household name all over the world, especially in Europe, plus its very extensive distribution and marketing network give it the necessary edge to become a leader in this field. An important reason for the hesitancy by some suppliers to assert themselves in this promising evolving market is that they feel it would be to their advantage to wait for a standard bus to emerge for home control. Not many companies are eager to endanger themselves by making a system which may well not be accepted as the standard. In this respect Philips can use its considerable momentum to make its technology become a standard; a practice it has successfully employed in the past in the audio cassette and laser disc fields.

International MSX-Newbrief

This newsletter, now in its second year of publication, covers the continuous development of MSX technology, the worldwide market situation and international user responses. It delivers hot news, opinions, and a critical analysis about the worldwide MSX situation. Among its present subscribers are the leading MSX manufacturers and software developers, who rely on MSX Newsbrief to monitor the evolution and success of MSX.

The editors of MSX Newsbrief travel extensively around the globe to gather the best possible information and they have access to the market research and user-attitude information of the Sala Communications' MSX magazines.

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The world's only newsletter about MSX

Philips New Media Systems

Philips International, with headquarters in Eindhoven, The Netherlands, and marketing and production units all over the world, is the foremost non-japanese electronics company in the world. Within Philips (known in the US under its Magnavox and Norelco brand names and as North American Philips) the division that is responsible for the interactive systems in the home of the future is HIS (Home Interactive Systems). One usually refers to this division as New Media Systems.

There is a Philips/Kyocera joint venture in Japan (New Media Systems) and this gives Philips a very strong OEM product partner. Currently Philips' main product is MSX computers purchased from New Media Systems, but at the CES, Magnavox introduced the Videowriter, a stand-alone word processor for the educational and home markets. Furthermore the HIS division sees CD-ROM as its turf. The general manager of the division, David Geest, is a heavyweight from the telecoms division of Philips and likes to go for big deals, so expect some surprising joint ventures and large projects in the near future.

MSX

Mid-1984 Philips surprised its European competitors like Thomson by becoming the first non-Asian company to support the MSX standard. Supporting MSX at that time was quite a daring step, and even now the outcome is not yet very clear. With Sony and Philips as the main supporters, MSX has gained a foothold in most European countries. In some, MSX has become the runner-up home computer behind IBM, notably in The Netherlands, Belgium, Spain, and Italy. France and Germany have been more hesitant, while the UK market place has proved to be very stubborn indeed with no breakthrough as yet. All in all, more than 400,000 MSX micros have been sold in Europe, and Philips has a very substantial market share. Especially with their MSX-2 machine which was first on the market in a number of countries, they have been very successful. In The



Netherlands they have sold more than 10,000 MSX-2 units, representing 20% of the total MSX installed base, even before competing MSX-2 products were available. Considerable success has been achieved with semi-professional projects, whereby MSX-2 is used as a relatively cheap terminal in videotex applications. Even the Dutch post office is now using MSX-2 machines in its Girotel electronic banking trial project.

68070

Philips is not only involved in applications, but its basic research activities are outstanding. For instance, the laser disc technology comes from their Eindhoven "Natuurkundig Laboratorium" (physics laboratory). Philips is also deeply involved in

chips technology (among others via Signetics) and has some very promising joint ventures with Siemens and other companies. Probably most important is its commitment to the 68000 line of processors as a controller for various consumer electronics applications. The 68070 processor has been developed to function as a microprocessor combined with various support and interface functions like DMA and MMU.

Dobus

Philips has taken another important step in the development of home control with DOB (D square B), the Digital Domestic Bus, sometimes also referred to as Dobus. This is a standardized transmission protocol intended to control domestic audio and

The X-10 protocol for superimposing control signals on powerline systems was developed at the end of the 70's in Scotland. However, it was the American company BSR that boosted X-10 to its present status as the major home control system in North America. At present, chances are that 90% of the customers installing a home-control system are using X-10 technology, sold under various brand names.

X-10 : Comfort driven home control



With the Macintosh version automatic remote control is possible.

A de facto standard in American residential control

Ask any hardware store or the Radio Shack shop around the corner for home control equipment, and they will point at X-10 plug-in modules and controllers. As X-10 equipment, under various names and incorporated in many systems like GEC Homenet, it has been so successful in North America, that it has become a standard in its own right.

X-10 USA Inc., formerly BSR Powerline X-10, claims to be the world's leading manufacturers of home control systems. The basic X-10 Powerhouse controller which plugs into a standard electrical outlet works by sending signals over the regular home AC wiring to X-10 remote control modules anywhere in the home. The system requires no additional wiring and is quickly installed by homeowners or tenants. Lamps and appliances plugged into control modules which in turn are plugged into wall outlets, are controlled by X-10 Powerhouse signals from the controller. As an added convenience, X-10 Powerhouse console has rocker switches which provide manual ON-OFF control of eight lights or appliances.

In addition to plug-in modules, X-10 makes wall switches and outlets that can replace normal home fixtures. These X-10 products look and work like ordinary fixtures, and also respond to X-10 Powerhouse commands.

X-10 modules and accessories are U.L. listed and available from Sears & Roebuck,

Radio Shack and other outlets. There are a number of other brands of home-control equipment using X-10 OEM products, among them the GE Homeminder system. A line of X-10 products is also marketed by Leviton Manufacturing Company to electrical distributors and contractors for commercial and industrial control applications, especially in energy management, and to the residential construction market for professionally installed home control systems.

Benefits

Mr. Peter Lesser, president of X-10 Inc., describes the benefits of using X-10 Powerhouse around the home. "Consumers now can get a taste of a good life — at a very palatable price," he says. "It serves many useful roles. As a security system it outwits burglars by making a home look and sound lived-in. It's also an 'electronic servant' that awakens you weekday mornings to stereo music, brightened hallways, and fresh coffee, while remembering to let you sleep-in on Saturday. It turns outside lights on at dusk and off at dawn, and it switches off the TV and table lamp after you've fallen asleep. As an energy saver, it efficiently controls water heaters, central heating, and air conditioning."

Controller

One can use the X-10 controller as a stand alone unit, but interconnection to and control by a micro-computer enhances its

functionality. Software for this purpose is already available. The X-10 Powerhouse peripheral system is currently available for popular microcomputers like the Apple IIc/IIe, the Macintosh, the IBM PC, and the Commodore 64/128 computers.



The X-10 controller and lamp-module

In the Mac version, the X-10 Powerhouse software takes full advantage of Macintosh's superior drawing and graphics display capabilities, and it carefully guides the user in setting up a home control system. The software provides a blueprint-style floorplan that users can, if they wish, easily customize with the mouse to resemble their own home or office. The floorplan includes furniture and pull-down menus

are stocked with icons of different styles of lamps, a coffee maker, TV, table radio, home stereo, crock pot, and other home appliances. Users can also create their own furniture and appliance icons using MacPaint.

Setting up the control system is fast and easy, and changes can be made at any time. X-10 Powerhouse software permits 24-hour, 7-day programming, so that day-to-day schedules can be, but need not be,

someone unplugs the unit to move it to another location.

In addition to sending programming information into the controller, the software also permits instantaneous remote control of lamps and appliances directly from the computer keyboard.

Easy Installation

The X-10 Powerhouse technology is ready-to-use right out of the package and

of Brown Boveri and located in Ludenscheid, Germany. Busch-Jaeger is a very well known and respected electrical engineering and installation company. The company, using the brandname Timac X-10 for its products in the "Hausleittechnik" area, not only sells X-10 products, but has improved and adapted them for European requirements.

In Europe at present home control has a somewhat different perspective than in North America: less emphasis on comfort and security systems; more geared towards energy conservation and professional applications in larger complexes and industrial use. This has to do with the legal and media-political situation. The PTT in most countries has a monopoly on information transfer beyond the private domain and therefore there are fairly stringent limitations on information transmission in the house, even if it concerns RF, powerline or even separate hardwired systems. This means that the signal levels of the X-10 equipment had to be adapted in order to make sure that the signals cannot be carried over to other houses. In West Germany the various regulations limit the signal level to U_{eff} max = 0.39 V and 5 mW in the 120 KHz frequency range. Since the aim is to transform home control systems into a home information network, media politics play an important role, too. All this has led to complicated and lengthy approval procedures and adaptations of the system. The approval of a system by the various authorities in Europe is a burdensome process. In some cases it took more than two years to get approval, but at present Busch-Jaeger has succeeded in most European countries and projects have been satisfactorily installed in many of them.

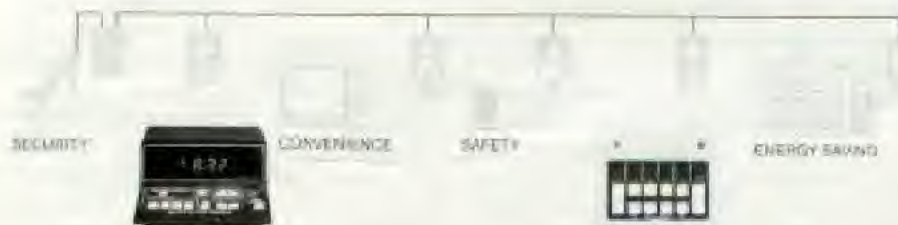
Some other companies, notably Siemens, working on a similar system, have recently withdrawn their earlier products for home control.

Dialogue Control

Apart from the crosstalk and distortion problems, one of the disadvantages of the X-10 technology is its "monologue" character: there is no duplex connection. For many applications it is necessary to have some kind of feedback loop in the system in order to ensure reliable and secure operation.

Further development work on the system is being done in this area. Another function could be simple voice signal transmission in the house; for this purpose Busch-Jaeger has a voice communication system called Infoton (half-duplex).

6:00 AM - SPOONFEIGHTS ARE START COFFEE
8:30 AM - WAKE TO STEREO AND LIGHT
9:45 PM - PRE-COOK A ROOM
4:15 PM - STEREO ON, HOUSE SOUNDTRACK ON
5:45 PM - LIGHT UP HOUSE ENTRANCE
8:30 PM - SECURITY LIGHTS ON



different. It also permits the brightness of incandescent lights to be set to specific levels. Menus, including floorplans, can be printed out while on-screen.

As the user selects devices and timing schedules, the computer loads the information into the X-10 Powerhouse's memory, and the entire control system is run according to the stored information. Alternate schedules can also be stored on a disk file for use at another time. A 9V battery protects the controller's electronic memory and powers its internal real-time clock, either during a power failure or when

installs in seconds. After plugging an incandescent lamp into the lamp module, and then plugging the module into a wall outlet, anyone can use the Controller to turn the lamp on or off from any room in the house. It can also adjust lamp brightness, even if the lamp itself is not equipped with a dimmer control.

Europe

X-10 products, designed for 220 Volt, 50 Hz operation, are marketed in Europe for commercial and consumer applications by Busch-Jaeger Elektro GmbH, a subsidiary

In the USA the concept of the All-Electronic Home has been picked up by some industry groups. The building industry, which builds houses and larger complexes and installs equipment and wiring, has been very active in coordinating some efforts. They have united some of the biggest corporations in a single project.

The Smart House

Intelligent Building

In the fall of 1984, the U.S. NAHB (National Association of Home Builders) Research Foundation, Inc. announced a concept called the Smart House, a wise move toward intelligent building which secures the involvement of the building industry in a new trend. Their concept promises to make new homes easier, more comfortable, and safer to live in, simpler to manage, and even less costly to maintain.

The Rockville, Maryland, firm invited several corporations and governmental agencies to join them in a unique research and development effort to provide a unified power/signal wiring system that would be safer, more versatile and more capable than the current 120 volt A.C. electrical circuits.

The Smart House Foundation is supported in its efforts by the National Association of Home Builders (of which it is a wholly-owned subsidiary) and NAHB's educational arm, the Home Builders Institute.

A Smart House Development Venture, Inc. has been set up and more than twenty corporate entities have joined since the beginning of the year to bring this new technology to market, a.o. Apple Computer, Bell Northern Research, Bundy Corporation, DuPont Connector Systems, Emerson Electric Company, Federal Pacific Electric Company, General Electric Company, Honeywell Corporation, National Semiconductor Corporation, North American Philips, Shell Development Company, and Whirlpool Corporation. Trade groups such as the Gas Research Institute, the Electric Power Research Institute, Copper Development Association, and others, are representing their special interests to ensure the comprehensive and practical application of the wiring system and its products.



Public Sector

While the Smart House is a private sector initiative, public assistance is coming from the U.S. Department of Commerce through its Office of Productivity, Technology, and Innovation, from the U.S. Department of Energy, and from other agencies. Included among those other agencies are the following: the Consumer Product Safety Commission, the Administration on Aging of the U.S. Department of Health and

Human Services, the Veterans Administration's Rehabilitation Research and Development Service, the National Institute of Building Sciences, and the Technology Utilization Program of the National Aeronautics and Space Administration.

The Basis is Wiring

The basic component of the Smart House is the wiring. Currently in our homes we have A.C. power cables, low-voltage wir-

Smart House Project schedule

How will Smart House work and when should we expect it to take a place in our lives?

A demonstration of the basic technology will be displayed at a Gaithersburg, Maryland, USA, home this fall. By the end of the year a mobile exhibit will be available for showing throughout the country. A laboratory house is scheduled for construction in Bowie, Maryland, in the spring of 1986, and a production version of the house is slated for the following year.

Acceptance of Smart House technology in the National Electrical Code is expected in January 1987. Nationwide training programs for contractors and installers will begin the summer of that year, concurrent with final product evaluations.

The first applications of Smart House products will be in single-family detached home construction beginning 1987. By 1988 it will be incorporated into multi-family units. Introduction into commercial construction could be expected by 1990.

ing for such things as door bells and exterior lighting, alarm system wiring, TV antenna wires and/or cable TV (CATV), audio speaker wires, and, of course, telephone wires. All of these strung like so much spaghetti throughout our homes. Initial designs of the Smart House wiring system call for a single cable that will perform three functions:

- 1 power distribution
- 2 control/data signal distribution
- 3 audio/video signal distribution.

Of these functions, the third requires substantially greater bandwidth.

Outlets/Connectors

The use of such a multi-purpose home wiring system will require specially designed outlets and connectors in order to prevent the mismatching of power and signals with a particular device. Keep in mind that you will not only be able to plug a lamp or hair dryer into any outlet, but you will also be able to plug in your telephone, security sensor, smoke detector, TV screen, TV antenna, and stereo speakers into the very same outlet.

Many manufacturers, like the X-10 company and GEC, have been introducing products to extend the capabilities of conventional wiring for more than a decade. Most of these products are a great stride forward. However, most of them are not interchangeable; they do not interact with each other, and they are severely limited in what they can do when compared to what is possible with today's (and tomorrow's) technology.

Functionality

There are several attributes of the Smart House wiring system that spell out real growth and progress for new homes and apartments. They include:

- 1 compatibility among all appropriate components;
- 2 significant reduction of electrical shock hazard;
- 3 significant reduction of gas and electrical fire hazard;
- 4 simplified electromechanical appliances;
- 5 expanded communications, automation, home security and personal health applications;
- 6 less costly metering and monitoring of natural gas, electric power and utilities;
- 7 backup system in the event of power failure;
- 8 increased potential for improving functionality.

Smart House Background

Of course standardization or even legislation is the ultimate goal of this Smart House project. The development, produc-

HOME BUS REPORT

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tion, and marketing of a system that will abet the national competitiveness of American manufactured products and American licensed technology is at stake, according to the Foundation. Here we can only assume that one sees Japanese or European competition around the corner. In fact this very magazine shows, that the whole subject of home control is a hot item everywhere.

Closed-loop

An important point is that the Smart House project already aims at improved control and feedback loops. Subsystems should be able to confirm their status in order to enhance reliability and safety. A closed-loop system requires the device or appliance to be able to generate a feedback signal. That signal will tell a system controller what kind of device it is (radio, power drill, washing machine, etc.) and in what state it is. The system controller (which includes new chips under development by Smart House) will then send the appropriate power through the circuit to the device.

Controllers

The Smart House controller does not stop there; it continues to ask the device if it is operating properly. As long as the device keeps responding that everything is okay and that the user has not turned it off, the

controller will continue to send power through the circuit.

If the circuit wiring or the outlet is faulty; if the plug is removed from the outlet; if the cord gets cut or frayed; or if the device under power develops a malfunction, then the controller receives a different signal and shuts down power. Likewise, if you put your finger in the outlet, it will not send the appropriate signal to the controller; therefore the controller won't send any power to shock you.

Master Control

It would be natural to think that the Smart House would have a centralized controller - a master control center - one focal point to monitor and control all other aspects of the power/signal system. In fact, the Smart House can have such a central control, but it does not have to. In all likelihood, most home owners will probably want a Smart House with distributed intelligence. The idea of a central (home) computer as controller might appeal to enthusiastic computer users, but we think that embedded computer power and software is more appropriate for such an everyday application in our future residences.

Note - Most of the material for this article was received from the Smart House Research Foundation

Intellisys Corporation is a Dallas, Texas, based software company that markets its products, research, and engineering capabilities to companies planning to participate in the market for intelligent homes. Companies expected to use Intellisys' products include: consumer electronics manufacturers and resellers, utility companies, communications equipment suppliers, security companies, computer manufacturers, HVAC companies, builders, and architects.

Intellisys

The All-Intelligent Home in IBM Style

Portia Isaacson, one of the micro-computer industry's gurus and founder of Future Computing, is taking an active part in the new field of interactive home control.

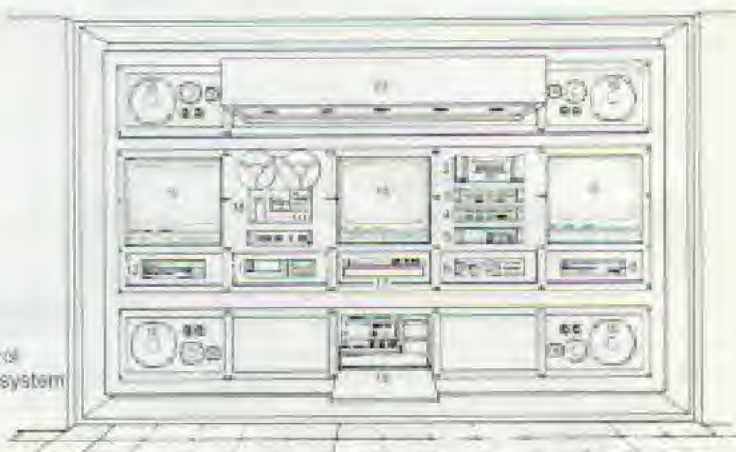
Steve Wozniak with Cloud 9 is another one. Together with her partner, Tricia Parks, she has set up a new company, Intellisys, to develop new software products for home control and monitoring. She has made a showcase for integrated home control called IntelliHome in her futuristic Dallas, Texas, home by filling it with the most advanced electronics and computers on the market. Her company's product, however, is not hardware. Intellisys Corporation has developed a modular software control system which allows increased functionality and integration of home systems with several human interface options. All of the home's systems including entertainment (audio and video), lighting, HVAC, water, pool, security, and communications are under central control. In addition to controlling existing functionality from one place, Intellisys software supplies greatly enhanced functionality and monitoring ability to many of its subsystems.

IBM Oriented

Although one expects the software to become available in various formats, at the moment most of it is MS-DOS/IBM oriented. It uses PC units to display the information and act as the main user interface, although obviously many subsystems have different input/output technologies like voice-input/synthesis.

The IBM orientation of this project is not surprising as it reflects the backgrounds of the executives from Intellisys who have been extensively involved with IBM hardware and software in the past. We feel, however, that a more universal software approach, and specifically one that could be ported to other (Japanese/Philips/Apple) hardware, would enhance the marketability of the Intellisys software.

Part of the control and information system in IntelliHome



Complex Management Task

With the increasing number of electronic components and systems within homes, the difficulty of managing all these systems increases exponentially. A simple example is the home with a media center including television, stereo, and VCR. Each of these systems includes some degree of programmability, yet each has a different user interface. As the number of controllable systems increases, so do the user interface options, and thus the likelihood of home-owner frustration or intimidation. The areas of greatest concern to Intellisys and of utmost importance to the success of electronic homes, include increasing system functionality in accordance with consumer desires. This entails delivering understandable benefits and providing a consistent and intuitive user interface. To test these assumptions, Intellisys will conduct significant research with homeowners on these topics in the first half of 1986. The original research will include a series of focus groups at IntelliHome. The objective of this research is to question consumers who fit the upscale demographic profiles of the owners of expensive homes for their reactions to electronic homes and to the functionality of specific subsystems.

Beta-test

These concepts can only be tested in a fully equipped environment. IntelliHome provides such an environment. This house is a unique showcase for home-control in itself, incorporating the most advanced hardware and of course the Intellisys software. The futuristic characteristics of the house, its functionality, and the impressive control room provide optimal comfort and control for its inhabitants.

Some special features of the IntelliHome are described below.

The keypad on the door is an input to the home control computer system that is also linked to the security system. To detect intruders it uses a perimeter-detection system, pressure-sensitive mats, and motion sensors; it is even possible to alert the police via telephone lines or a radio link. The authorized codes that the owner punches into the keypad to enter the house automatically disarm the security system. The computer with a library of such codes unlocks the doors. In case the computer goes down, the owners have a key. Isaacson and her husband plan to store several scripts in the computer for lighting and music, one of which will be a default mode that can be changed from their office or car by telephone. Recognized from their co-

des, the computer will then instruct the 50-title compact-disk changer accordingly. When the house greets a guest who has been recognized from his unique code or asks a stranger to leave a message, the voice is not a recording. Using the IBM PC AT (that is the home control computer), the phone system, and a Digital Equipment Corp. text-to-speech converter, the special feature Future-Home can answer calls and initiate connections to and from phone extensions in the house or anywhere in the world.

There are many more interesting items in and around the house, but what is the aim of all this? IntelliHome is not only a house; it is also a research environment; a lifesize simulation to test user reactions to systems which are in development for the intelligent home of the future.

Research

Intellisys is undertaking extensive research together with interested companies. Manufacturers of home systems, communications equipment, or utility products need to understand what additional features will be required of their products in intelligent homes. Questions confronting these companies include:

Which of the several potential user inter-

faces is optimal for the consumer?

Which home systems are most important to home owners?

What additional functionality offered by home control systems is most important to home owners?

Intellisys Corporation's research will distill information on these issues.

Focus Groups

Intellisys Corporation will conduct a series of focus groups at IntelliHome. Some of these groups will include consumer participants; some will include home building trade participants.

Within the consumer focus groups, some will be dedicated to probing reactions, comments, and desires concerning the entire home control system including its user interfaces and subsystems. Others will examine user interfaces plus specific complementary subsystems in order to monitor participant's reactions to current functionality and desires for increased functionality.

The industry groups will focus on trade concerns, desires, and reactions, in addition to exploring current customer interest in sophisticated high-tech products. The following issues will be examined:

1 Overall Interest in Integrated Home Electronics

The first focus group will probe participants for reactions to the entire home control system plus subsystems. Reactions to user interfaces and home owner preference for available subsystems will be carefully monitored.

2 Entertainment, Lighting, and Pool

The second focus group will monitor reactions to user interfaces, the perceived importance of entertainment and lighting control, plus specific functionality desires of home owners.

3 Safety, Security, Lighting, and Communications

Group three will focus on home owners' reactions to IntelliHome's user interfaces and sophisticated security systems, including lighting and communications.

4 HVAC, Water, Pool, and Communications

Group four will focus on reactions to various user interfaces and the importance of and desired functionality for HVAC systems, water (including sprinkler) systems, the pool, and communications.

5 Industry focus groups will explore trade reactions to the concepts and systems implemented in IntelliHome.

HOME BUS INFO

The newsletter for the informed ones!!

This magazine gives you a very broad overview about the emerging home control industry. If you are interested in the area, want to keep informed about news and development, need more in-depth information, critical analysis and the opinion of our expert editorial staff, do subscribe to our regular newsletter HOME BUS INFO. It is much more condensed than this magazine, addresses the specialists of the home bus industry and will reach you 10 times a year by airmail.

It is truly international, as we have our offices in the US and Europe, and very good sources in Japan, the Far East, South America, and Eastern Europe. Our editorial staff has in-depth expertise in telecommunications, computer science, home computers, building and standardization. They travel extensively around the globe, are multilingual and are also available for consulting assignments.

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Keep ahead of the crowd by subscribing to Home Bus Info.

The house of the future will certainly be different from today's dwelling, but the description that would aptly describe the electronic backbone of the new habitat is as yet unknown. Various candidates are the Automated Home, Home Automation, Home Control and Command. Will it be mainly a convenience item; will it encompass emergency and medical alert functions or telecontrol and telemetry? In Japan the strategic battle for the home is the most intriguing one of all. Japan, as the leading supplier of consumer electronics, has some interesting projects under way.

Home Bus Japanese Style : Refined and Complicated

Understanding the web of industrial relations in Japan is very hard for outsiders; understanding the Japanese approach towards Home Control is nearly impossible. The major participants in Japan Inc. work together in a number of projects, but these projects seem to have different flag bearers, different government-body sponsoring, different direction and little coordination. Only one common factor describes them all: technological advancement in a sociological context. The Japanese tend to experiment a lot with new technology, but have become aware of constraints caused by reluctant social and psychological acceptance.

There are many schools of thought concerning the future of home electronics. One is that MSX will be the unifying force and that controllers based on MSX technology will be the building block for the next decade. Mitsubishi displayed its "Home of the Future" at the Summer CES in Chicago 1985 using an MSX-2 as controller for some applications.

The participating Japanese companies have taken part in experiments like the Kansai Solar Home, and displayed a variety of approaches at the 1995 Tsukuba Science Fair. They also take part in standardization groups from MITI, the Department of Post and Telecommunications, the trade associations or NTT.

Home Bus Standardization

According to the Japanese description, a Home Bus consists of several information channels and a control channel.

A number of corporations have designed and constructed their own home net-



works: the Kansai Home project uses the KEC Home Bus; there is a Home Bus from the Ministry of Post and Telecommunications; and MITI has its own design. Most of these, however, use the same baud rate (9.6 Kbps) and combinations of cable pairs and coaxial cable as transmission medium. The transmission medium is not combined with the mains power supply; synchronization is startstop, while access and

contention control is channeled via CSMA/CD. NEC has a different experimental power line Home Security Bus system.

Mitsubishi supports the Home Automation System, a fairly complex structure with an interface for telephone, telecontrol and various audio/video connections. The HA system is one of the few in which a multi-layered hierarchical structure with subsys-



Physical structure of the HA system

tems is clearly defined, and interfacing with the ISDN and two-way cable TV systems is foreseen. A coax cable is used to carry multiplexed data (including video) and control signal, while a pair of metallic wires is used for telephone signals.

The Machinery Federation and Electronic Industries Association of Japan have issued a report on "Home Bus standardization for home information and control systems" in August 1985. The purpose of the report was to compare the several systems and to attain a unified system. It also considered the compatibility with the international standards as set and discussed by ISO, IEC etc.

The basic Home Bus standard proposed in the report consists of a Main and a Sub Bus. The Main bus is composed of combinations of the coaxial and pair cables for transmitting control, sound, and picture signals. Users can select from a maximum of 4 pairs and 2 coax cables.

The Sub bus is not standardized for the present because of the many different media that have to be connected.

Not Productivity Oriented

The Japanese, with their vast experience in all kinds of domestic equipment but with little success in home computers, have of course used "intelligence" in its embedded form in almost all the consumer electronics equipment. There is nothing new about Control integrated dishwashers or VCRs; we have long since accepted the fact that their user friendliness comes through embedded intelligence. The Japanese home bus signature will be comfort oriented, hardly visible to the end-user, and without loud claims of security and energy conservation.

In the U.S., home automation is mentioned in the same context as office automation. One talks about the home workstation including complete computer units with printers, data storage, telecommunications, and other paraphernalia belong to the U.S. professional knowledge worker. The residential PC is there to facilitate the type of work now executed in an office environment and to expand on teleworking and telecommuting trends. This approach may be viable in the U.S. and in other specific types of social structures, but is less appropriate for other cultures.

In Japan it is unlikely that one will use data processing, knowledgeworker, or office concepts as main parts of the home bus. This does not mean that "intelligent" building trend for offices is being neglected. Some prestigious projects like the "Toshiba building" demonstrate the willingness to experiment with more professional networks.

Home computers are made by many manufacturers, but few of them have ever tried to standardize or harmonize their machines with other computers or equipment. Commodore is compatible with Commodore only (and not even all the time), Apple with Apple, etc. As a result, home computers are very much stand-alone machines with limited applications. MSX was supposed to change all that. However, the Microsoft Extend Basic concept, once promoted as the world's standard for home computers, has fallen a bit short of its promise. On the other hand, MSX still is the only multi-vendor standard in the low-end computer arena and its support by leading electronic firms like Philips, Matsushita, and Sony makes it most likely the MSX will play a key role in the growth towards wider use of one intelligence.

MSX : the Home computer and beyond



Back in 1983 when the home computer industry was still booming and standardization in a market dominated by Apple, Commodore, and Radio Shack was nowhere to be found, the June 1983 announcement of the MSX standard came as a surprise to the industry. Unified under the Microsoft banner, the cooperation of the most prestigious Japanese electronics companies shocked the consumer electronics world. The Japanese were coming, was the general fear, and when Philips joined the MSX ranks the Microsoft Extended Basic standard became the hottest thing in the industry. It was Kazuhiko (Kay) Nishi of Ascii in Japan who took the basic 8-bit general purpose home computer concept of Harry Fox and Alex Weiss of Spectravideo, adapted and enhanced it and got the Japanese industry united behind the new standard. Even at that time the idea was to use MSX or future generations of MSX as more than just a computer. It was anticipated that home intelligence would expand beyond the keyboard and would encompass home control and other functions. MSX would be developed to be the main controller of such a system.

Since 1983 the home computer market has stabilized, and the ambitious plans formulated by Kay did not materialize. In the past two years, MSX achieved considerable penetration in Japan and in some countries in Europe, but the optimistic projections of several million machines sold in 1985 and 1986 had to be adapted. The 1 million machine mark was passed at the end of 1985.

Although a moderate success in Japan and Europe, MSX has never more than applied the North American market. When

recently Microsoft, in the process of going public, had to clarify its situation, it ended its relationship with Ascii and because of that the future of MSX is somewhat uncertain.

Universal Controller

MSX as a design had many advantages at the time, although some criticism has been uttered about the choice of 8 bit Z-80 technology for both the initial MSX-1 and the more recent MSX-2 designs. However, the third release of MSX, expected in about 18 months, will certainly be 16 and probably 32 bit technology. Even if it doesn't carry the MSX tag any longer, it will still represent a combined effort by the most prestigious companies in consumer electronics to agree on a standard.

Kay Nishi himself believes firmly in the future of MSX, especially for the wider home control applications. "I see Home Bus as the thing of the future and MSX as one of its main components. We will therefore actively support further development of this kind of applications for and with MSX technology."

Dr. Y Moshida, managing director of Nippon Gakki (Yamaha) and one of the main chip-makers behind MSX, says: "We use and support MSX now because it gives us the power and the software environment we need. We try to enhance the MSX functionality with our own extra's, like our audio and musical line. We also experiment with intelligent kitchen equipment using MSX. When we need more powerful processors, we try to stay with MSX or we design our own chips, like for the 24 bit audio-technology we are working on."

Most Japanese MSX manufacturers have, in one way or another, expressed their interest in expansion of the MSX concept to other applications.

Jan Bodzinga, our executive editor, interviewed Luc Sala, president of Sala Communications and initiator of Home Bus Info. What attracted Mr. Sala to this new field and what makes him so determined to assume a leading role in its development? Luc Sala is a born entrepreneur and has become the most successful independent computer publisher in The Netherlands. He is known for his outspoken views which have in the past contributed to shaping an industry.

Luc Sala : Home Bus (Info) is here to stay

The future, our task is not to foresee, but to enable it.
St.Exupery

Like most journalists, initially Luc Sala didn't intend to enter the world of high-tech publications. In fact, he never published a single word before 1982. In addition to his extensive university education (degrees from the Delft University of Technology and the Erasmus University Business School), his experience as industrial engineer and projects manager in international corporations gave him quite an edge when he started to write about the specialized field of digital telecommunications and microcomputers.

As a free-lance journalist and author on computer and new media subjects, he quickly made a name for himself as an aggressive and capable prober. He traveled extensively around the globe, and his work appeared in magazines throughout the world. At the end of 1982 he was asked to become the launch-editor of a micro-computer magazine for a major Dutch publisher (VNU); half a year later Patrick McGovern, Chairman of Computer World, entrusted him with the assignment to publish another one; and in 1984 he started the first magazine of his own, *Commodore-Info*. That became an instant success and today, 20 months later, this magazine is the largest computer magazine in The Netherlands with a print run of 50,000, and 36,000 sold. In the meantime three more magazines in The Netherlands, one in Germany, and a couple of international news-

letters have made Sala Communications a respected contender in the European computer publishing industry. In a related, but somewhat different direction, the service to the readers of these magazines has been expanded with software/leasing services, computer shows, books, special computer programs like tax form preparation, and joint ventures with leading software houses to develop, import, and export programs for home computers. Sala Communications offers its customers, the end-user on one hand and the vendors on the other hand, more than the average publishing house.



Mr. Sala, why do you leave the computer magazine business to engage in a new and hardly developed field like home computing?

L.S.: I don't intend to leave the computer publishing business, as we have a very healthy operation there. We are still expanding and trying to meet the needs of our customers. Especially the machine-specific magazines have been our mainstay and will remain so for many years to come. As some machines become outdated and lose their customer base, new ones will emerge creating demand for

specialized information from their users and for a marketing tool for the manufacturers of software and specialized hardware. Our latest magazine, in addition to our titles serving Commodore, MSX, Atari, and Schneider users, is Commodore Business Info, specifically geared to the PC-10/20 and Amiga users.

On the other hand, it cannot be denied, that the heyday of the home computer business is over, that we detect diminishing interest in literature about computers, that we have to adapt our advertising income projections, and that many micro magazines are folding.

I assume that there will always be home computers or personal computers and that there will always be a market for magazines serving the users of those machines. But it makes sense, to look ahead and see what is coming. I believe that the automated home or home control in its many forms will be one of the hottest medium tech items in the last three years of this decade, both as a personal comfort enhancer and as a political issue.

Do you mean that installing control, security, and monitoring systems will become a sensitive subject?

L.S.: Just as people are up in arms these days in connection with any privacy issue, as the "hacker" culture makes headlines, as high tech crime is "hot", this issue has controversial aspects and politicians will certainly not miss the opportunity of getting involved. Media politics, interest groups, there are so many angles to home control that it will become a major item. For instance, what will happen if people figure out a way to burn down their house or even commit worse crimes from a distance or with preprogrammed and untraceable software tricks? And what if insurance companies discriminate in either direction regarding premiums for controlled and non-controlled homes?

On the other hand, there are strong arguments in favor of more elaborate automation in our daily lives regarding energy conservation, security, and hygiene. The example of the automatic (infra-red activated) faucet illustrates this. I foresee that soon public places will be forced to adopt these and other "hands free" items for hygienic reasons.

How long will it take before Home Bus in any form will become a household item?

L.S.: In the U.S., with fewer government restrictions and a tendency towards power line systems, we will see a wide application of home control and monitoring before the end of the decade, but we expect its



development to be hampered by lack of standards. Also the time will come when one requires more reliable and tamper-proof systems. At that time issues like privacy protection will begin to influence the technological design.

As usual European countries will initially be at a disadvantage because all countries concerned have to agree on a communal standard. Without a standard there won't be much of a market. Once this international standardization process is completed, implementation of the technology can proceed, due to the obvious advantages, perhaps even faster than we can now anticipate.

The influence of the Japanese manufacturers in this area is less certain. Will they market their technology internationally, or sit on it and experiment at home? They might be a late entry in the race, but due to strategic alliances with large European corporations (Philips/Siemens), they could make a very strong impact in the early 90's. They do manufacture the equipment that has to be interfaced with the Home Bus so it is their natural turf.

You are one of the main supporters of MSX in The Netherlands and Germany, and you publish the only newsletter in the world about MSX; isn't MSX going to be the thing of the future?

L.S.: MSX is very much alive in Japan, but even more so in Europe. I foresee a lot of developments coming from the MSX supporters. Although I have been slightly disappointed in the development of MSX, especially in the U.S., it still is the only multi-vendor standard around. It is quite possible that Philips, Sony, and Matsushita will not call their future product generation MSX any longer, but it will still be an extension of the standards now used in MSX. There is already a whole new wave of

the so-called "Green" technology from these manufacturers based on 68070 technology and hinging on CD-ROM to enhance "home intelligence" application. A key player in the development of the MSX standard is Kay Nishi, who made it happen at a time when everybody believed that the Japanese were unable to overcome their internal differences in order to play a role at all in microcomputers. At present there is unrest concerning the ASCII-Microsoft relationship and the MSX technology. I hope Kay will regain control over MSX. He has promised us improved support for MSX. I expect, that the Japanese manufacturers will use MSX-units as embedded controllers in many devices, both in professional and domestic applications. MSX has a future as a home computer, but even more so as a universal controller.

Will the present MSX micro generation be the starting point for low-end home control systems in Japan and Europe?

I don't think so. Although standardized as far as interfaces go, practically none of the MSX-1 machines have the RS 232 interface, so important for I/O applications. The same applies to the first MSX-2 models on the market. We will of course witness the application of MSX technology to control other equipment. The importance of MSX with respect to Home Control is the fact that it unifies the same companies which are destined to play a major role in Home Bus development. I think that we have to wait for further MSX developments and my guess is, that the "Green" CPU, the 68070, will be part of that MSX generation. The big electronics companies have (also with MSX) learned the importance of portability and compatibility in the market place, and will use MSX as a stepping stone for future home control developments.

INDUSTRY NEWS AND PRODUCTS

• Columbia Electronics (516-239-0265) markets an electronic faucet. With an infra-red sensor the faucet responds to a hand as it approaches. Faucets, either controlled by Infra Red or voice-activated, have applications in hospitals and for the handicapped, but they are also suited for general use. Increased fear of infections will stimulate the use of this kind of equipment in public places.



Better sensor technology, like the infra-red sensors, voice recognition, and other sensors are an important part of the Home Bus technology, and there is no reason why the bathroom scales (which already talk) cannot become part of the overall monitoring system.

• A new magazine covering this market called "Electronic House" came out earlier this year in the U.S.

• Steve Wozniak has realized the importance of this new field and has become involved through his company Cloud Nine which manufactures equipment for single-room control systems for recreational use, phone (408) 996-9999.

• An EIA steering committee on Home Bus chaired by Jud Hoffman of Matsushita was established to define a data-addressing and command language for Home Electronics Bus. An interim standard is scheduled for mid-1986.

• Sanyo is working on the HC1 system, based on MSX technology and intended as a controller for kitchen equipment, but potentially with a wider span of control including alarm functions and interconnection with the telecoms networks. HC1 is comprised of a TV-set with an integrated MSX computer. Sanyo envisions a larger and more powerful Home Control central computer with MSX units as slave controllers.

• Philips has initial samples of the DDB chip (to be used in appliances in order to connect to the DDB bus) and an end-user acceptance test site has been set up at its Eindhoven, The Netherlands, headquarters.

• RCS protocol: Infrared control of audio and video equipment is not totally standardized. The Japanese use a NEC chip for this purpose, while most European manufacturers use the Philips RCS Remote Control Protocol. A disadvantage of the present IR systems is the lack of feedback; the transmission is one-way only.

• And how about the "Butler in a Box" from Mastervoice (213-594-6581), 18523 Humbolt Street, Los Alamos, CA 90720, USA; an environmental control system based on advanced (in-house developed) voice recognition technology. From up to 20 feet one can command the "Butler" to carry out tasks. The system responds semi-intelligently by using a name and giving some random (again semi-AI) responses. As sound is its strength, it will detect the presence of a person in the home, speak to him, and find out if his voice matches one of its master's patterns. There is also an interface to the telephone allowing for automatic dialing and answering of calls.

• MasterSwitch is a system made by Destron 500, Alden Rd. 11, Markham, Ontario, Canada L3R 5H5 (416-477-6950; telex 06-963548 BCI TOR DES). It is a general home control system with the MasterSwitch as a portable master control unit. The receivers are plugged into wall outlets with the control devices in turn plugged into them. The system works with a receiver dial code and a house dial code. Control signals are RF, and there is no physical hard wired connection between the master and slaves. The range is claimed to be 350 feet regardless of walls; max. 32 devices; retail price \$80 for master, \$30 for appliance control.

• HomeMinder: GE intends to make this Homenet/HomeMinder the standard in the home control systems world. Homeminder is a system that uses the mains power as a carrier for signalling modules. The signalling consists of a home specific and an appliance specific code in order to make the signalling as specific as possible without interference with the neighbor's system.

GE's competitors don't expect these efforts to be very successful. Not many manufacturers would rush into making products compatible with GE's HomeNet. HomeMinder consists of a central unit (optionally combined with a TV set and/or telephone gateway) and various modules: The ApplianceMinder, the LampMinder, the Light Switch module, TemperatureMinder, and the MiniMinder 8 appliance subsystem. Information: GEC, Portsmouth, Va. 23705, J. Ziegler tel: 804-4835062.

• SMARTHOME, made by CyberLynx, 4828 Sterling Dr., Boulder CO 80301 (303)444-7733, has a control unit with a pre-programmed microprocessor responding to signals (via radio transmission or existing electrical wiring) from the remote control unit and sensors. Apart from the the control, Smarthome contains several components which communicate with the control unit by means of radio transmission or existing electrical wiring. It's possible to use a microcomputer in order to display the condition of the system and to reprogram Smarthome. However a graphics card is needed to run the Smarthome software. After programming the control unit, the computer can be disconnected and system works as a stand alone system. The control unit is connected to the computer via a RS-232 interface. Smarthome is compatible with devices (sensors, telephone dialers, power line controllers, e.g. X-10) from other manufacturer's. The price

of Smarthome is around \$600 (starter kit) to \$1600 (complete system).

• The European Community RACE project, where telecommunications companies like Philips/AT&T are participating in research, is aimed at designing a new broadband communications network for the second half of the 90s.

• The use of the compact-disk as a carrier of new, intelligent, but not home computer oriented, software has been studied. This is different from the CD-ROM applications; the basic device remains the normal CD-player with video enhancements.

• CD-ROM was the subject of a Microsoft conference at the beginning of March where the new Logic File structure standard was announced by the High Sierra group.

• In Japan, Matsushita offers a separate home Local Area Network (LAN), controlled by distributed programmable microprocessors using their own twisted-pair wiring and radio-frequency modems which allow it to transmit video and audio data.

• Pennsylvania Power & Light is testing a home control (energy conservation) system that runs on a Commodore 64. Phone (215) 398-0434.

TEMEX

In Germany the concept of the ISDN (Integrated Services Digital Network) has received much support by the PTT (DBP) and the government. One of the advanced projects in this respect is TEMEX, a new data-transmission service of the DBP (Bundespost). The name comes from TELeMeTry eXchange. It offers telemetry of fairly limited performance, initially mainly for monitoring purposes for industrial users.

The Bundespost uses the following definitions to describe the Temex activities. Teleprocessing or "Fernwirken" has two subfields, being "Fernüberwachen" (monitoring) and "Fernsteuern" (control). The monitoring has two aspects, telemetry (e.g. measuring energy usage) and tele-alert.

Temex is not a switched network, it works with transmission over fixed lines, with constant supervision. It uses the telephone pair, but in the exchange the Temex signals are separated and directly connected to a Temex exchange, so there is no interference with normal telephone service.

Temex operates in the 40 kHz frequency range, so outside the telephone 300-3400 Hz frequencies.

The Temex service has started with pilot projects in Mannheim, München and Stuttgart.



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